

THERMOS

Accelerating the development of
low-carbon heating & cooling networks



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Covenant of Mayors Investment Forum
Bruxelles, 19 February 2020



District heating and cooling is now in the core of global climate action



Global action

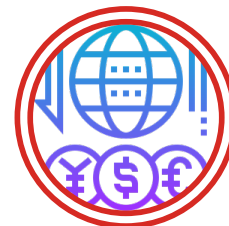


Local Action



District heating is at the heart of sustainable energy transitions

District heating has the potential to cost-effectively provide for at least half of the heating demand by 2050

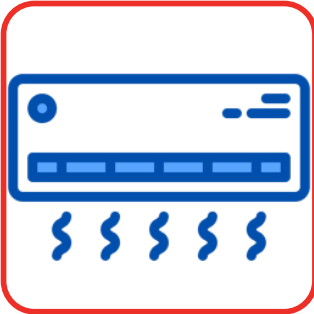


Expansion of thermal grids is crucial to enhance grid flexibility & integrate increasing shares of renewable energy systems

District heating is the most economic and technically viable solution for most urban areas



District cooling: a new energy challenge for cities in a changing climate



The use of energy for space cooling is growing faster than any other end use in buildings, **more than tripling between 1990 and 2016.**



Rising demand for space cooling is already **impacting electricity systems** in many countries, as well as **driving up emissions.**



Problem

Pre-feasibility studies for thermal networks are **expensive**, take **time**, and rely on **uneven approaches**, leading public authorities to face **growing challenges** to effectively manage their energy planning tasks.



Needs of Local Authorities



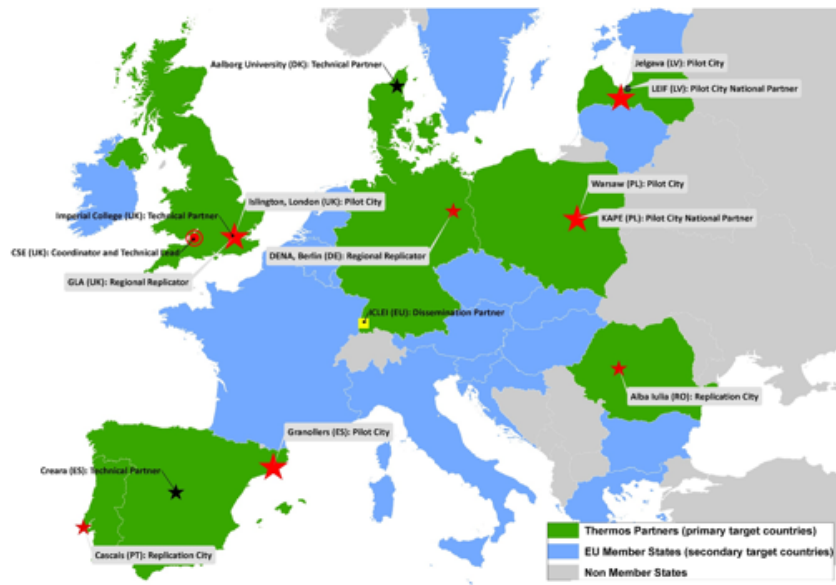
- Consistency in approaches
- Comparability of results
- Information about methodologies used
- Time and cost efficiencies

- **Robust methodologies and tools to rapidly identify, analyse and compare specific thermal energy system option**

- **Building capacity for energy planning is essential to develop strategic local sustainable energy solutions.**



THERMOS Consortium



- Brings together research, consulting and multiplier organisations with local, regional and national authorities - the final users
- Provides for development, validation and exploitation





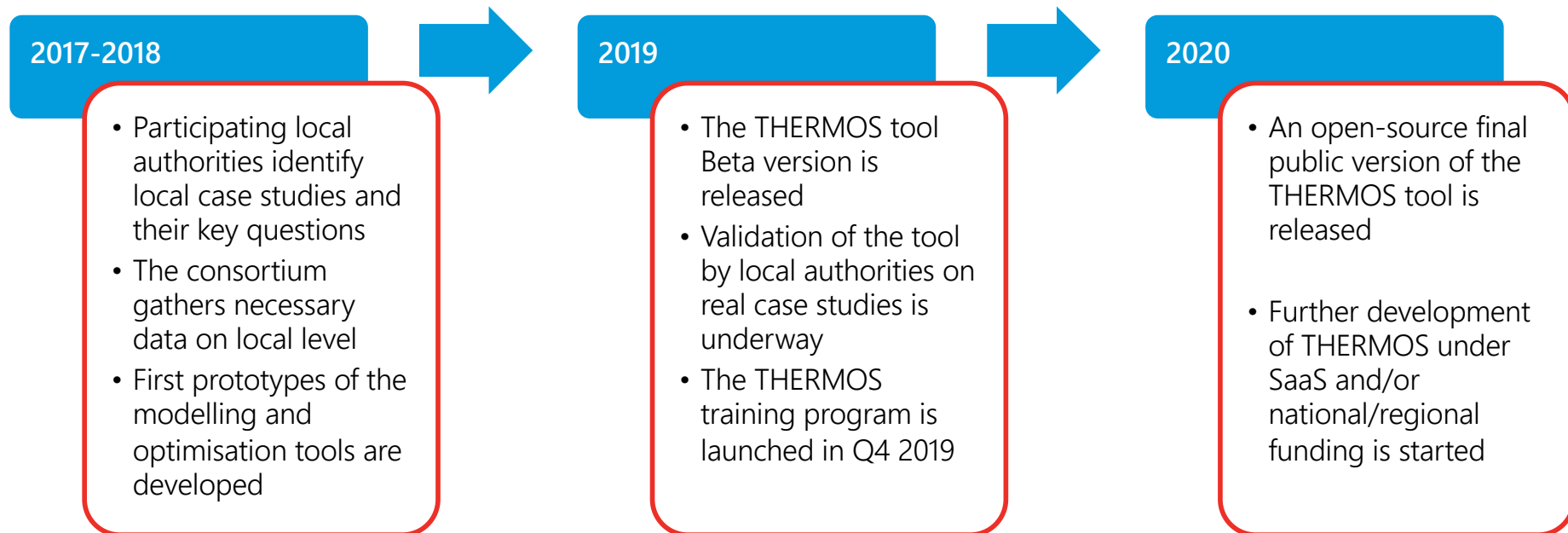
Overall Approach

1. Generalise, implement and share and methods and data for high-resolution **energy system mapping**
2. Develop **thermal energy system models and optimisation procedures** which run on these maps
3. Integrate the maps and the models in an **open-source software application** developed in close collaboration with **pilot local authority users**
4. Support the use of the new tools with **replication partners**
5. **Promote** and **disseminate** our results to maximise post-project **exploitation**





Timeline and Milestones





THERMOS: Thermal Energy Resource Modelling and Optimisation System

An open-source software designed to:



optimise local district energy network planning processes



support sustainable energy master planning



identify and select low-carbon heating options in real geographies



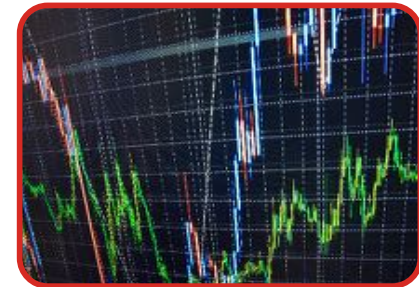
Applicability



THERMOS allows to address early-stage planning of district energy systems, reducing the time and efforts needed to identify concrete opportunities before starting the design phase



THERMOS addresses four main thermal planning use cases



1

Expansion of existing district heating and cooling networks

2

Planning a new network given a known energy source

3

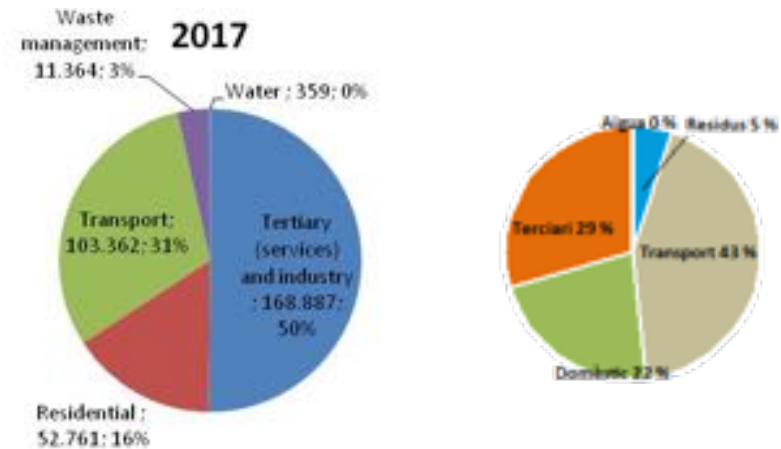
Planning a new network serving a given local thermal demand utilising one or more energy sources

4

Identifying optimised solutions when considering energy efficiency measures, thermal networks and/or individual H&C measures

Granollers - Key information

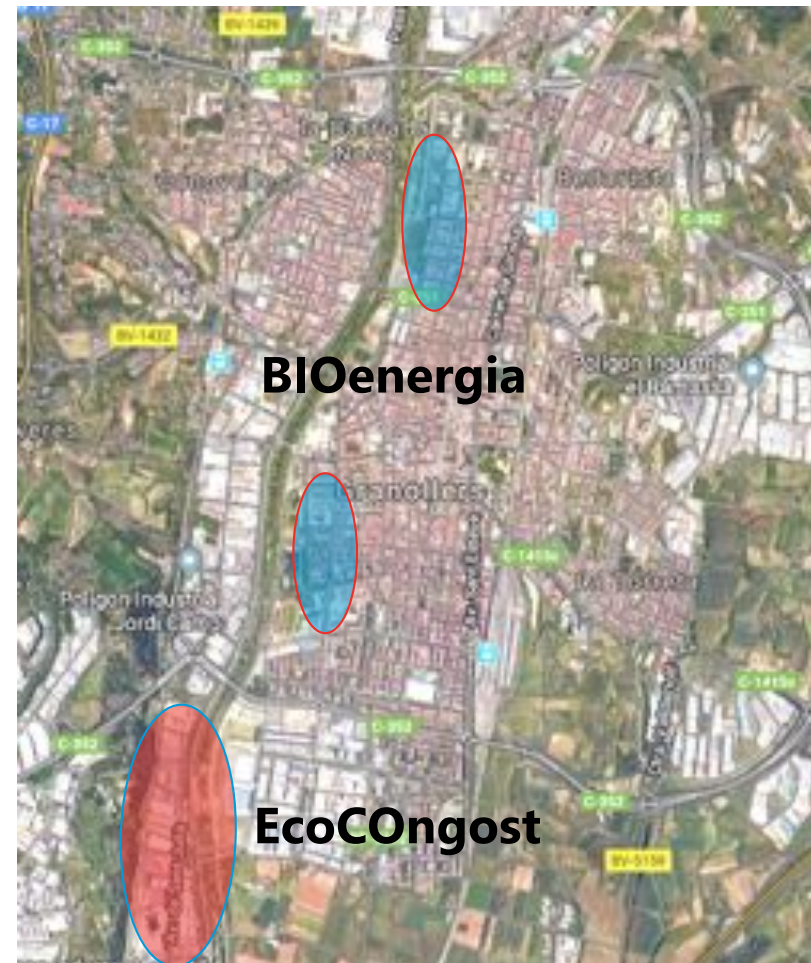
- The industrial sector is the main GHG emission source in the city
- Since 2008, Granollers in involved in the CoM and has developed several planning initiatives





THERMOS Case Studies

- **THERMOS helps Granollers** to meet the local thermal planning objectives:
 - **Better estimation** of thermal energy demand for industrial and residential sectors
 - Evaluation of **different alternatives** for local decision makers
- The **SEAP** approved in 2009 already features the industrial area **EcoCongost project** as a key project to produce and use heat with local renewables
- **Study of urban area users** for the **BIOenergia thermal networks** to be completed in 2020-2021





Case study - Ecocongost

Ecocongost - Key objectives

- **Energy supply options:**
 - **Biogas from organic waste digestion** available up to 12 million m³/year.
 - **Sewage sludge** energy recovery up to 2.4 GWh/year
 - **Biomass: local forest biomass** available 18.000 Tn/year. Energy production: 63 GWh/year
 - **Natural gas:** To reach peak demand: 22.5 GWh/year (can be reduced with more biogas production)
- **9 industrial buildings** with steam demand for industrial processes
- **Total demand** to be satisfied: 102.5 GWht/year
- **Project calendar** not defined yet





Case study - BIOenergia

BIOenergia - Key objectives

- Energy supply:
 - **Local biomass**
- **5 + 7 buildings**, mainly schools and other public facilities
- **Total demand:**
 - 611 MWh/year (North branch)
 - 705 MWh/year (South branch)
- **Financing:** 50% European ERDF funds and 50% municipality budget
- **Project calendar** in progress, estimated completion:
 - North branch - early 2020
 - South branch - 2021







Benefits of using THERMOS for energy planners



Integrating local (low-carbon) energy sources to their local thermal networks

Better network design on a prefeasibility stage



To meet local sustainability goals, such as energy, GHG emissions and air pollution reduction goals



To reduce energy costs and promote energy efficiency



To foster innovation and collaboration among public and private sector



THERMOS Online Training

Step 1

Get introduced: 3 recorded Webinars on:

- Energy system mapping & modelling
- Embedding THERMOS in your city
- Optimising thermal planning

**Kick off
March 2020!**

Step 2

Get started: 3 guided exercises & support videos on:

- starting your project with THERMOS
- optimising planning decisions
- modifying demand & network paths

Benefit from free THERMOS supporting material on energy system demand & supply and innovative financing models

Step 3

Be a Pro: develop and advance your own case study with support from THERMOS partners (optional)

Obtain a Training Certificate at the end!



Additional Information

- THERMOS website: www.thermos-project.eu
- THERMOS tool demonstration video: www.youtube.com/watch?v=r14L63Bf2t0
- THERMOS training material: <https://www.thermos-project.eu/get-involved/training/>
- Try out the THERMOS tool: <https://v5.thermos-project.eu> (email registration needed)

All you need is a standard web browser and an internet connection!



Thank you!



Ajuntament
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